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Over 200 New Projects Added to OIT's Energy Efficiency R&D Portfolio in 2001

OIT launched more than 200 ambitious new research, development, and demonstration (RD&D) projects in 2001. "These projects are expected to contribute to the attainment of the goals of the President's National Energy Policy," said David Garman, DOE's Assistant Secretary for Energy Efficiency and Renewable Energy. Through an open solicitation process, OIT invests in RD&D projects that help boost industrial energy efficiency and productivity. Each project can last from one to three years, during which time OIT's industry partners match OIT's investment.

"Our industry partners help us leverage government R&D investments. They also bring to the table unique knowledge and resources that are essential in accelerating technology development," said Garman.

This issue of *The OIT Times* highlights selected new projects in OIT's portfolio. **An on-line supplement to the print version of this issue lists the titles and partners of all OIT's new RD&D; visit www.oit.doe.gov/news/oittimes.shtml.** For additional information on any of the projects or programs, call the OIT Clearinghouse at 800-862-2086.

"Industry interest is building as these collaborative RD&D projects surmount long-standing technological hurdles to greater efficiency in some of our most energy-intensive industries," said OIT's Deputy Assistant Secretary Denise Swink. OIT has zeroed in on the most promising new technologies since enlisting industry to define its top priorities in a series of roadmaps. "Under our Industries of the Future (IOF) partnership strategy, OIT targets its RD&D solicitations toward projects that address these industry-defined roadmap priorities," she said.



New Projects Issue

OIT's IOF strategy is extremely flexible. It allows each industry to play as active a role in the solicitation process as appropriate. Whereas industry participates in the technical review of R&D proposals for all nine of OIT's Industries of the Future, industry is able to assume an even more active role when feasible. In the **Forest Products** industry, for example, task groups within the American Forest and Paper Association assist in defining industry solicitation topic areas, and AF&PA itself issues the solicitations in cooperation with OIT. This arrangement works well as AF&PA is the dominant association representing the entire industry. Its members may participate in projects as cost-sharing partners, but may not be the lead project recipients.

New OIT projects listed at www.oit.doe.gov/news/oittimes.shtml

Members of the **Glass** industry similarly develop priority topic areas under the auspices of the Glass Manufacturing Industry Council. Solicitations are issued by OIT, and all GMIC members are eligible to propose projects.

OIT's R&D solicitations are issued for each of the nine Industries of the Future as well as for 'enabling' technologies used widely throughout industry, such as **Combustion, Sensors & Controls**, and **Advanced Materials**. Widespread use of these technologies means that even small energy efficiency gains can immediately translate into large savings on a national scale.

To make sure no worthwhile technology slips through the cracks, OIT's grant programs provide financial assistance at both end of the

(continued on page 12)



Metal Casting

Saving energy by reducing scrap



OIT's **Metal Casting** Team is supporting over 40 cost-shared R&D projects with over 300 university and industry partners. These projects will reduce scrap in casting, thus lowering melting and energy requirements.

Two new R&D projects of special interest are *Yield Improvement and Defect Reduction* and *The Prediction of Part Distortion in Die Casting*.

The near-term goal of the *Yield Improvement and Defect Reduction* project led by the University of Iowa is to increase casting yields in steel foundries by 10%. Eventually, the new techniques should increase yields by 25% on an optimized casting system. Research has shown that substantial yield increases are possible using alternatives to current rules for riser design, and has identified variables with strong statistical influence on casting yields. Researchers are exploring conventional and unconventional techniques for decreasing the size and number of risers needed to produce quality castings. Future work will develop new feeding distance rules for carbon and low-alloy steels, which will be published by the industry. Ultimately, this research has the potential to reduce scrap by as much as 30%--significantly reducing energy requirements for melting.

Ohio State Univ. is leading a project on *Prediction of Part Distortion in Die Casting*. This project is part of a larger program of research to improve design capabilities in die casting. R&D will define comprehensive 3-dimensional scaling factors surrounding the thermal and mechanical phenomena that act upon the die. This research will lead to improvements in productivity and quality in die casting.

Energy savings and emissions reductions will be achieved by improving first-shot capabilities and by reducing the number of interruptions through better design. Such research will also allow better dimensional control, resulting in less molten material required per shot and fewer secondary machining operations.



Aluminum

Microstructures may hold key to big energy savings



OIT's **Aluminum** Team recently awarded six projects to university-led teams with supporting industrial and National Lab partners. Team Leader Sara Dillich observes, "All these projects support fundamental R&D that will create a better understanding of how aluminum micro-structures develop and change with mechanical processing." Results will cut energy use, boost productivity, and help the environment.

For example Lehigh Univ. is working with Alcoa Technology to improve scientific understanding of the *Surface Behavior of Aluminum Alloys Deformed Under Various Processing Conditions*. The goal is to establish a relationship between surface behavior, metallurgy, and mechanical forming process parameters. This will help to increase extrusion and rolling rates and product yield while saving processing energy.

A team led by the Univ. of Kentucky is conducting *Fundamental Studies of Structural Factors Affecting the Formability of Continuous Cast Aluminum Alloys*. The team will establish basic relationships between processing, microstructure, and formability in continuous cast sheet products. Better understanding of these relationships may expand use of this process, lowering energy use and costs. Partners include Commonwealth Aluminum Co., Oak Ridge National Lab, and Secat, Inc.

Washington State Univ. is working with Alcoa Technology and Pacific Northwest National Lab on the *Development of an Integrated Methodology for Thermo-mechanical Processing of Aluminum Alloys*. The goal is to develop a model that can predict microstructure evolution in polycrystalline alloys undergoing large-strain plastic deformation. The model will improve energy efficiency, allow process optimization and alloy development for industrial manufacturing.



**Sara Dillich,
Aluminum Team
Leader**

Steel

Lower energy, operating costs targeted



New R&D projects in the **Steel** Team portfolio will reduce energy use, decrease mill emissions and improve competitiveness. Four projects are described here.

One team is developing a lance-based *Optical Pyrometer for Continuous Measurement of Melt Temperature in a Vacuum Degasser*. The sensor will enhance process control, reduce process times for low-carbon steel, eliminate thermocouples, and reduce energy use and emissions. Partners include Process Metrix, AISI, Berry Metal Co., Bethlehem Steel, Heraeus Electro-Nite, LTV Steel, and USX-U.S. Steel Group.

Another team is developing

a *High-efficiency, Direct*

Flame Impingement

Technology for rapid

heating of steel

shapes. More

efficient energy

use and heat

transfer will

reduce NO_x,

decrease scaling,

and keep load

temperature more

uniform. Partners

include the Gas

Technology Institute,

Bethlehem Steel, Geneva

Steel, North American

Construction Services, North American

Manufacturing Co., Timken, and Ural State Technological

Univ.

Other researchers are developing an *Intelligent Process*

Control System for Optimum Electric Furnace Steelmaking.

The "Steelmaker Pilot" will integrate knowledge-based

computing techniques to monitor, optimize, sequence, and

control power use, processing and reduce flicker on the grid.

Partners include D. L. Schroeder & Associates, DOE's Albany

Research Center, Univ. of Alabama, American Combustion,

Broner, SMA, and UHP International.

A team led by Michigan Technological Univ. is exploring

Beneficial Reuse of Basic Oxygen Furnace/Basic Oxygen

Process Slags. Members are developing ways to separate iron

units from the BOF slag and prepare them for furnace charge,

and save energy. The National Mine Land Reclamation Center

at West Virginia Univ. will evaluate the residue as a neutralizing

agent for acid mine drainage. Partners include Acme Steel,

Ferrous Environmental Recycling Corp., INMETCO,

USX-U.S. Steel Group, and Veltec.



Industry experts support OIT

OIT draws on the extensive collective knowledge and experience of a growing number of industry experts to help inform industry about opportunities to save energy and reduce costs using OIT-supported technologies and energy management practices. The current list of industry experts supporting OIT includes the following individuals, among several others:

Agriculture

James Hill
TechScope, LLC
1 Doubletree Lane
St. Louis, MO 63131
314-965-5394

Aluminum

John Green
Consultant
3712 Tustin Road
Ellicott City, MD 21042
410-465-6354

Chemicals

Joseph Rogers
AIChE
3 Park Avenue
New York, NY 10016-5991
212-591-7727

Forest Products

David Ashcroft
Inst. of Paper Science
and Technology
5716 Bramblewood Drive
Raleigh, NC 27612
919-345-1000

Glass

Vincent Henry
Henry Technology Solutions
603 Florence Road
Ann Arbor, MI 48103
734-623-7445

Metal Casting

Robert Eppich
Eppich Technologies
1720 S. Virginia Street
Port Lavaca, TX 77979
361-552-9298

Mining

Robert Johnson
Metallurgical Consultant
415 Nor-Jean Way
Safford, AZ 85546
520-428-8186

Petroleum Refining

James Vermich
Process Innovators
285 North Davis Blvd.
Bountiful, UT 84010
801-397-1983

Steel

John Stubbles
Steel Industry Consultant
6325 Lake Front
Mason, OH 45040
513-398-9926

If you are interested in participating, please contact the appropriate OIT Team Leader or the OIT Clearinghouse.

Mining ***Increasing mine yield***



The OIT **Mining** Team's R&D projects for 2001 address a range of technologies that will help the industry save energy and increase yield. Three of these projects are highlighted here.

The project on *Fibrous Monolith Wear-resistant Components* is exploring use of a patented processing technology to keep the costs of energy and advanced materials competitive. The process will increase the wear life of mining drill bit inserts, point-attack tools, dozer teeth, and hydro-cyclone apex tools. Led by Advanced Ceramics Research—a joint venture between ACR Inc. and Native American-owned San Xavier Development Authority—the team includes Phelps Dodge Sierrita, Kyocera Corp., Phelps Dodge Bagdad, Krebs Engineering, Inco Ltd., the University of California Santa Barbara, and the University of Arizona.

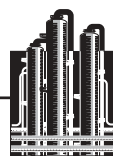
Virginia Tech Univ. is leading partners Massey Coal Services, Partition Enterprises, and Precision Testing in a project on *Dense Media Cyclone Optimization*. The team is developing a model-based expert system and other engineering tools to improve the efficiency of energy use and heavy media cyclones in removing waste rock from coal. The project has already produced an expert system checklist for efficient cyclone operation and maintenance. A web site is being developed to provide expert system software and simulation routines to interested companies at no cost.

Stolar Horizon, Inc. is leading a project to demonstrate the feasibility of saving energy through real-time stress measurement, bit loading, and horizon sensing on a longwall shearer, boring machine, continuous miner, and loading bucket. A prototype sensor has proven that uncut coal can be measured in real time, and the technology was featured in the May 2001 issue of *The World of Smart Mining*. Partners include Los Alamos National Lab, CONSOL Inc., RAG American Coal, FMC Corp., Lee Ranch Coal Co., and the Colorado School of Mines.



www.oit.doe.gov/mining/

Petroleum Refining ***More efficient separations, step-by-step***



"**Petroleum refining** is a series of separation steps," explains OIT's Petroleum Team Leader Jim Quinn, "and energy can be saved in many of those steps." Each of five recent R&D projects address potential improvements in petroleum refining.

For example, *Energy-saving Separation Technology for the Petroleum Industry* is developing separation membranes as an alternative to energy-intensive distillation. The project focuses on pervaporation separation of hydrocarbon mixtures and uses reverse selectivity membranes for hydrogen recovery. Membranes are being developed for improved selectivity and permeability, and superior physical, thermal, and chemical durability. "Membrane technology is a less active, less heat- and energy-intensive process than distillation," says Quinn.

A new rotary burner being developed by the *Rotary Burner Technology Demonstration* (Phase I) project makes use of free drive energy. "It uses fuel gas pressure and spins itself," explains Paul Flanagan, President of Calcpas Engineering, the product designer. The Calcpas rotary burner (CRB) will provide a simple, cost-effective way to retrofit existing fired heaters. Its mixing capability also enables the CRB to provide high-performance heat transfer with ultra-low-emissions. Flanagan anticipates a 5% energy savings and adds that the burner may also be valuable to the chemical industry. "It can improve any heater operation," he maintains.

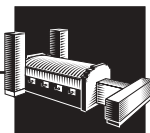
The three other new projects include *Ensuring Mechanical Integrity of Refinery Equipment through Global On-stream Inspection*, an inspection technology that saves energy by minimizing downtime while ensuring the mechanical integrity of refinery equipment; *Micro-gas Chromatography Controller for Petrochemical Application*, a process controller that monitors ethylene production; and *Biocatalytic Desulfurization of Petroleum*, a biological processing method that will reduce the level of sulfur in transportation fuels.



Jim Quinn,
Petroleum
Team Leader

www.oit.doe.gov/petroleum/

Glass ***Optimizing energy and materials use***



The latest projects from OIT's **Glass Team** promise significant energy and productivity benefits for a wide spectrum of U.S. glass companies. Three of these are described briefly below.

Energy Research Co. is leading a research team in exploring the use of laser-induced breakdown spectroscopy (LIBS) for the *Measurement and Control of Glass Feedstocks*. A LIBS probe is being developed to determine the chemical makeup of glass feedstock before it enters the melting furnace and provide data for a feedback control loop. The technology is expected to dramatically improve productivity and product quality while reducing energy use and emissions. Partners include Fenton Art Glass Co., Mississippi State Univ., and Oak Ridge National Lab.

PPG industries is working with Sandia National Labs (SNL) to develop *Process Optimization Strategies, Models, and Chemical Databases for On-line Coating of Float Glass*. The technology will improve the efficiency of the atmospheric pressure chemical vapor deposition technique currently used to deposit tin-oxide coatings on about 110 million square feet of flat glass annually. The project is expected to reduce energy use, by-products and coating defects that cause process inefficiencies. Container and specialty glassmakers may also benefit from the technology.

Gallo Glass Co. is working closely with SNL on another application of LIBS technology for the *Monitoring and Control of Alkali Volatization and Batch Carryover* to reduce particulate matter, increase furnace life, and improve furnace fuel efficiency. By continuously monitoring the correlation of metal concentrations with operating conditions (including oxygen-to-fuel ratio) over long periods, this LIBS technique will identify batch properties and furnace conditions associated with batch carryover and alkali volatization. The technology will help minimize the energy and other costs of producing containers and flat glass.

Supporting Industries ***Energy efficiency of key suppliers targeted***

OIT has identified seven industries that provide essential support to the energy-intensive Industries of the Future. These seven industries include **forging, heat treating, welding, powder metallurgy and particulate materials, carbon products, process heating, and advanced ceramics.**

In 2001, OIT awarded five R&D projects to help these industries become more energy efficient. Two projects focus on the heat treating industry, two on the forging industry, and one on the welding industry. All of the R&D will result in cleaner and more energy-efficient technologies that will have carryover benefits for the nine 'Industries of the Future.'

New CD-ROM features energy-saving glass technologies and energy management practices

OIT's **Glass Team** recently released a new CD-ROM titled *Resources and Tools for Energy Efficiency and Cost Reduction Now*. The CD-ROM, which opens with an inviting animated introduction, provides information on

- innovative energy-efficient glass technologies
- energy analysis software tools
- hands-on energy saving tips
- plant energy efficiency assessments
- financial assistance

The CD-ROM helps users learn about and take advantage of OIT's many products and services for the glass industry. The CD-ROM also enables users to link directly to OIT's Glass Team Web site and other useful web pages.

The *Resources and Tools for Energy Efficiency and Cost Reduction Now* CD-ROM is available at no cost by

- calling OIT's Clearinghouse at 1-800-862-2086,
- sending an e-mail to resource@ee.doe.gov or
- ordering from OIT's on-line catalog at www.oit.doe.gov/catalog.



OIT's Rolf Butters and Marilyn Burgess reviewing Glass Team's new CD-ROM

Agriculture

New partnerships aim to break down barriers



The **Agriculture** Team launched six new R&D projects and three education grants in 2001. Team Leader Mark Paster describes the R&D teams as “large collaborations of excellent capability.” Each will address at least three of the four key industry-defined technology barriers to using renewable materials as substitutes for fossil feedstocks.

For example, Iowa State Univ. is leading five partners from industry, academia, and the national laboratories in an effort to develop *Multi-component Harvesting Equipment for Inexpensive Sugars from Crop Residue*. This project will modify wheat for increased sugar and decreased lignin content, develop equipment to harvest and separate stems and grains in a single pass, and study wheat straw-to-sugar processing.

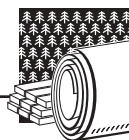
A second project, *Development of Improved Chemicals and Plastics from Oilseeds*, is led by Dow Chemical Co. and involves three additional partners. The team will research and develop technology to convert castor oil for use in making plastics, polymers, and other materials. The castor oil crop will be honed for better growth under dry land farming conditions, resistance to pests and disease, and improved agronomic content.

The *Biomass Biorefinery for Production of Polymers and Fuel* project, headed by Metabolix, Inc., involves four industry and seven university partners. The team aims to develop switchgrass that produces the biodegradable polymer PHA, which can then be recovered and processed into commercial-grade polymer blends to reduce use of fossil fuels and landfills. Remaining switchgrass components can be used as fuel to produce power. James Barber, of Metabolix, explains, “The project will bring to the agriculture industry a new, valuable biomass crop that provides both energy and polymers, sustainably.”



Forest Products

Diverse projects address key industry goals



OIT's **Forest Products** Team selected 13 new R&D projects from nearly 130 proposals received in response to its 2001 solicitation. “These projects align well with industry concerns,” explains Forest Products Team

Leader Valri Robinson.

Oak Ridge National Lab is working with industry and university partners on two projects that directly address one of the forest products industry's primary concerns—gasification. The projects are the *Evaluation of Ceramic Coating for Protection of Piping* and *Development of Corrosion-resistant Chromium-rich Alloys for Gasifier and Kraft Recovery Boiler Applications*. Protective ceramic coatings and corrosion-resistant alloys are crucial to the practical use of new, pressurized, high-temperature, more energy-efficient boiler and gasification systems.

With the advent of new MAC II emissions limits, the industry wants new ways to reduce energy use emissions. The *Development of the Pilot Plant for Field Test of Low-temperature Plasma Technologies* project is creating a pilot plant in which VOC emissions may be treated and tested. Initial demonstrations will be held at Georgia-Pacific Corp. plants; the plasma reactors will be a collaborative effort between the Univ. of Illinois at Chicago, Russia's Kurchatov Institute of Atomic Energy, Argonne National Lab, and Pacific Northwest National Lab. The partners hope to conduct on-site studies at additional mills.

The *Acoustic Forming for Enhanced Dewatering and Formation* project intends to create and commercialize new draining-element technology based on acoustic excitation processes. This technology, developed by the Institute of Paper Science and Technology (IPST), promises to enhance paper formation and increase drainage using advanced on-line control and profiling techniques. Cyrus Aidun of IPST says, “Acoustic forming technology, if successful, will result in higher production with less fiber and energy consumption ... a win-win situation for the industry, the consumer, and the environment.”

Chemicals ***Partnering for sustainability***



The **Chemical Team** selected eight new industry-led and five laboratory-led R&D projects for 2001. Team Leader Paul Scheihing declares, "The industry partners that brought these projects to reality are multiple, diverse, and complementary."

One team is developing *Solution Crystallization Modeling Tools* to minimize product loss and increase energy efficiency in crystallization—the most widely used process for separating and purifying chemicals that are solids at room temperature. The team includes OLI Systems, Fluent, Inc., Dow Chemical, Eli Lilly, Univ. of Utah, Iowa State Univ., Univ. of Sheffield, Illinois Institute of Technology, and AIChE Design Institute for Physical Property Research.

Distillation Column Modeling Tools are the focus of R&D by the Univ. of Texas at Austin, Oak Ridge National Lab, Dow Chemical, Koch-Glitsch, Praxair, Sulzer Chemtech, Fluent Inc., and 3D-1D.

Advanced computational modeling techniques will reduce emissions and energy use while improving production, packing performance, and operating conditions.

The Gas Technology Institute (GTI), BP, and ExxonMobil are working on *Enhanced Heat Exchangers for Process Heaters*. The team is using dimpled tubes as "vortex generators" to increase heat transfer rates in fired process heaters. This technology will cut emissions and increase thermal efficiency. Said GTI's Harry Kurek, "We anticipate that the technology will provide cost benefits in reduced fuel usage and downtime."

The *Oxidative Olefin Reactor* project is developing a novel oxidative dehydrogenation reactor to improve ethylene and other olefin yields while reducing energy use and waste. Project partners are Praxair, BP, and the Univ. of Delaware.



Paul Scheihing,
Chemical Team
Leader

OIT's Chemical Team releases first Annual Report

The first *Annual Report* on the Chemical Industry of the Future made its debut in October. "This report captures all of our activities and successes for 2001 in a nutshell," reports Team Leader Paul Scheihing.

The 50-page publication provides a summary of R&D projects and activities managed by the Chemical IOF Team in fiscal year 2001. For each active R&D project, the report provides a brief description of the work and lists the partners and potential benefits. Activity highlights include new roadmaps, R&D technology partnerships, emerging technologies, benchmarking tools, Allied Partners, state-level IOF activities, and plant-wide assessments. A key success is the industry's active and growing involvement in *Chemical Vision 2020*—a partnership for accelerating technology innovation throughout the industry.

You can view the report on the web by visiting www.oit.doe.gov/chemicals/pdfs/chem_annualreport.pdf or order a copy by calling 1-800-862-2086.



Coming soon! ***OIT's Customer Day 2002***

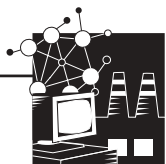
On May 9, 2002, OIT will host its 4th Biennial Customer Day at the Grand Hyatt Hotel in Washington, DC. The event will enable OIT to inform and obtain feedback from its customers on topics such as our communication and outreach efforts, and program ideas for Expo 5 (scheduled for February 2003). OIT will also be looking for ways to improve how it does business with its customers in areas such as administering solicitations, managing intellectual property, and working with the National labs and land-grant universities, among others. Also in the works is a reception on Capitol Hill.

OIT's Communications Team Leader Lou Sousa asserts "Customer Day offers several great opportunities for our customers to network with key players in industry and Washington. Attendees can also learn about what's new in OIT and provide feedback on how we can improve the services they get from us. We *do* respond to customer feedback and use it to make adjustments wherever possible. Customer Day is truly a critical aspect of our continuous improvement philosophy."

Got a question?
Call 1-800-862-2086

Enabling Technologies

New combustion, materials projects benefit many industries



Industrial Materials for the Future: OIT's IMF program has launched 28 new R&D projects led by industry, national labs, and universities. For example, Nooter Fabricators is heading a project to develop a new class of *Fe-3Cr-W(V) Ferritic Steels for Industrial Process Applications*. The project will improve energy efficiency, material performance and fabrication for hydrotreating reactor vessels, heat recovery systems, and other components for the **petroleum** and **chemical** industries.

ORNL is leading development of high-density infrared surface treatments that can be used to apply corrosion-resistant, high-emissivity coatings on refractories and other materials and will reduce surface porosity in refractories. The **glass** and **aluminum** industries could potentially save 30 trillion Btu annually with this technology.

Caterpillar is leading an effort to build an integrated model that will help increase weld joint service tenfold and reduce energy use by 25%. The model will address material selection, consumable design, process optimization, residual stress reduction, and fatigue resistance.



Combustion: Three new projects aim to liberate the **Forest Products** industry from the electricity grid. One project will demonstrate biomass gasification which, in combination with other gasification technologies, may generate up to three times more electricity per unit input than conventional recovery and stoker boilers. The project team will design, build and operate an advanced system based on the Gas Technology Institute's RENU GAS™ gasifier. It will process 100 tons per day of dry biomass from a paper mill. Product syngas will be used in the boiler to improve efficiency and cut emissions.

Another project started earlier will gasify 200 tons per day of non-Kraft black liquor using MTCI/StoneChem Pulse Enhanced™ steam reformer. The gasifier will be installed at Georgia-Pacific's Big Island (Virginia) paper mill.

A third project, expected to begin in late 2001, will design, build and operate an energy-efficient integrated Kraft black liquor and solid biomass unit at a Kraft paper mill.

Inventions and Innovation

Helping to facilitate commercialization



According to Program Manager Lisa Barnett, the 39 new **I&I** projects show commercial potential, solid work plans, and strong project teams. "We can facilitate commercialization," explains Barnett.

OG Technologies, for example, will demonstrate a high-definition camera system that takes 3-D parts measurements at temperatures up to 1,450°C with an accuracy of 0.1 mm or better, in less than 10 seconds. Measuring parts while they are still hot will dramatically reduce scrap in the domestic forging industry.

JX Crystals, Inc., will demonstrate a new thermophotovoltaic (TPV) device that is sensitive to infrared radiation emitted in response to exhaust heat. The device can be installed in industrial stacks to help the **glass**, **steel**, and **metal casting** industries generate electricity from waste heat. Power density is said to be 100 times higher than solar cells.

NICE³

Demonstrating new energy efficient technologies at work



In 2001, OIT's **NICE³** program awarded 11 grants to demonstration projects organized by collaborative partnerships. In one example, a new steam turbine will be installed at the Rolex Building in New York City to generate electrical power from energy previously wasted in pressure letdown valves feeding an absorption chiller. Lisa Barnett, **NICE³** Program Manager says, "It makes so much sense that you wonder why we haven't been doing this all along." Partners are the California Energy Commission, Douglas Energy Co., Rolex Realty, and Carrier Corp.

Washington State Univ.'s Cooperative Extension Energy Program and MagnaDrive Corp. will demonstrate a new adjustable-speed coupling system (ASCS) that should cut waste energy by 40-74% in 500-1,500 horsepower industrial motor systems.

One technology to be demonstrated was developed under the **I&I Program**. "Now it has picked up the backing of industry," explains Barnett. The technology uses ultrasonic Lamb waves for on-stream examination of petroleum pipe support areas. DuPont, Exxon/Mobil, and Shell Oil will host demonstrations.

OIT Clearinghouse

Answers & solutions...just a free phone call away



"This is beautiful. I just had one question, but now I've learned so much more about how OIT can really help me. ...This has been a very good phone call."

Recent caller to OIT's Clearinghouse

Do you want additional information about OIT-sponsored emerging technologies, or need help making your plant more energy efficient and profitable? Thousands of plant managers, R&D staff, corporate directors, and energy engineers have already benefitted from the information, tools, and assistance they received from the OIT Clearinghouse.

"With this issue of *The OIT Times* devoted to our R&D projects, I'm eager to let customers know that they can delve deeper into these technologies and learn about OIT's other services by calling our Clearinghouse," said Lou Sousa, OIT's Communications Team Leader. The Clearinghouse also answers your technical questions about industrial systems and processes. "Whenever you've got a question, they're there for you," said Sousa.

In the past year, more than 6,000 inquiries from industry and those who supply and serve industry came to the Clearinghouse. Dr. Lee Link, Clearinghouse Manager, notes that "callers are often delighted to find out how helpful OIT's services and products can be to them."

Recently a manufacturer wanted a report on an OIT-funded project, *Ammonia Absorption Refrigeration Unit Provides Environmentally-Friendly Profits for Oil Refinery*. Clearinghouse engineer John Ryan put the customer in contact with Don Erickson, the project developer, in Maryland. "This may result in a match between an emerging technology company and a commercialization site," says Ryan. "In a follow-up call to Mr. Erickson, we discovered that he has several other technologies ready for commercialization that may be of interest to energy-intensive industries. He was pleased when we invited him to display them at an upcoming State IOF technology exhibition."

Another Clearinghouse customer is Weyerhaeuser Company's Senior Scientist John Holmquist. "We've saved a significant amount of energy in our forest products plants and increased reliability through an aggressive motor management plan that relies on OIT motor system publications and MotorMaster+ software." A bonus was that the Clearinghouse helped link Mr. Holmquist to a regional motor laboratory and to a university that was researching motor efficiency testing. "Because of these connections," says Mr. Holmquist, "Weyerhaeuser was able to participate in the field research."

Gil McCoy, Clearinghouse Energy Systems Engineer, enjoyed helping Weyerhaeuser make these connections. "Frequently customers ask a specific question or request a publication. But, after talking with them awhile, I find out about the actual issues they're dealing with. That's when I can often identify other great resources or ideas for them to pursue."

Jennifer Carter, Manager of Clearinghouse Customer Service, is delighted by customers "who tell us they're truly pleased, not only by having a real person answer the phone, but also because they found so many helpful resources—even more than what they originally asked for. One of my favorite customer quotes is 'I found a *gold mine* here!'"

Got a question? Clearinghouse engineers and technical staff expertly answer industrial efficiency questions, 11 hours a day, Monday-Friday. The Clearinghouse also has access to industry experts around the country:

- By Phone: **1-800-862-2086**
- By Fax: 360-586-8303
- By Email: Clearinghouse@ee.doe.gov
- Monday–Friday, 9 a.m.–8 p.m. Eastern, 6 a.m.–5 p.m. Pacific



OIT Clearinghouse staff

New video explains OIT goals, 'Industries of the Future' strategy

OIT has released a new video (VHS format) that presents an overview of the Industries of the Future partnership strategy, how it works, who is involved, and why. The 15 minute video explains how the IOF partnership strategy has grown significantly over the last six years and highlights some of the direct benefits of the strategy to industry and the nation. In addition, the video captures testimonies from industry leaders who have experience working with OIT. OIT's new 'corporate' video is available at no cost to you by calling OIT's Clearinghouse at 1-800-862-2086 or sending an email to resource@ee.doe.gov.



OIT releases new Publications and Literature 2002 CD-ROM

OIT recently released an updated and expanded version of its very popular *Publications and Literature 2002 CD-ROM*. The new CD-ROM contains electronic copies of over 500 OIT publications, facts sheets, case studies, visions, roadmaps and other materials. The well-organized CD allows you to easily locate items of interest through user-friendly search and retrieval features that meet your specified criteria.

The CD also allows the user to view and print Adobe® (PDF) images of each document. For your convenience, the Adobe® Acrobat® Reader Software has been included to let you take full advantage of the Office of Industrial Technologies *Publications and Literature 2002 CD-ROM*.

The Office of Industrial Technologies *Publications and Literature 2002 CD-ROM* is available at no cost by calling OIT's Clearinghouse at 1-800-862-2086. You can also obtain a copy by e-mailing a request to resource@ee.doe.gov.



OIT rolls out a redesigned Web site...bookmark www.oit.doe.gov!

OIT launched a redesigned and expanded website in early October. The new '3rd generation' Web site—www.oit.doe.gov—provides access to the full range of OIT products and information, resources and publications. The site's new architecture and its intuitive navigation system help guide OIT's busy industrial customers efficiently to the information they want.

The site contains pages for each of the nine Industries of the Future (agriculture, aluminum, chemicals, forest products, glass, metal casting, mining, petroleum, and steel) as well as OIT's Best Practices, Enabling Technologies, State Industries of the Future, Financial Assistance, and International programs.

In addition, the site features detailed information on partnership opportunities, an up-to-date activity calendar, an on-line publications catalog, OIT's R&D portfolio, a news and events page, a solicitations page, and an 'Ask An Expert' page. Another new feature called 'Working with OIT' is collecting in one place all that OIT's customers want to know about how to partner with OIT.

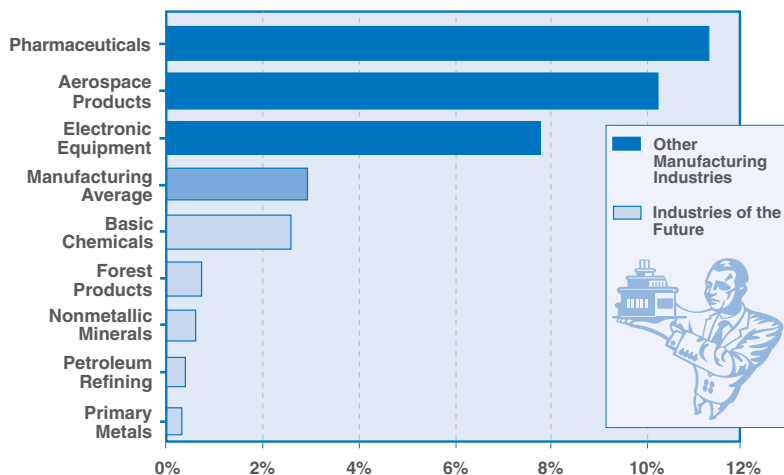
The redesigned Web site contains a variety of user-friendly features such as 'breadcrumbs,' pulldown menus, consistent labeling, and a site map that helps users get a bird's eye view of the site so they can quickly locate the information they want.

To access OIT's new Web site and learn more about OIT and the 'Industries of the Future,' visit www.oit.doe.gov.

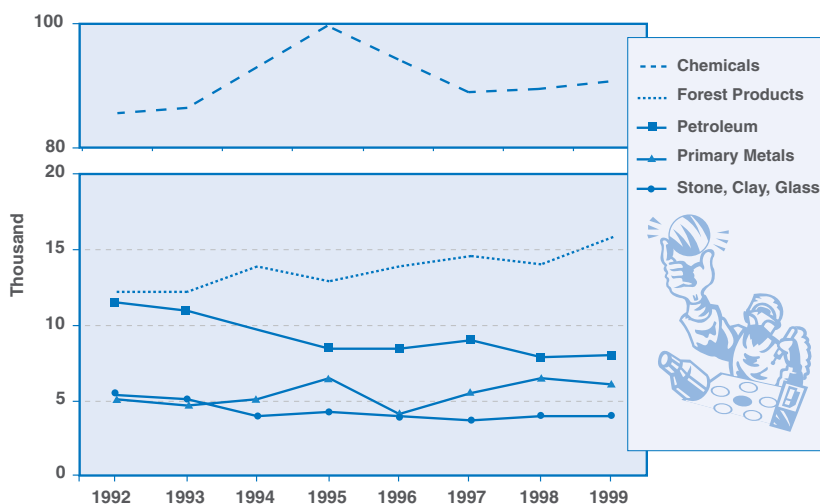


INDUSTRY TRENDS

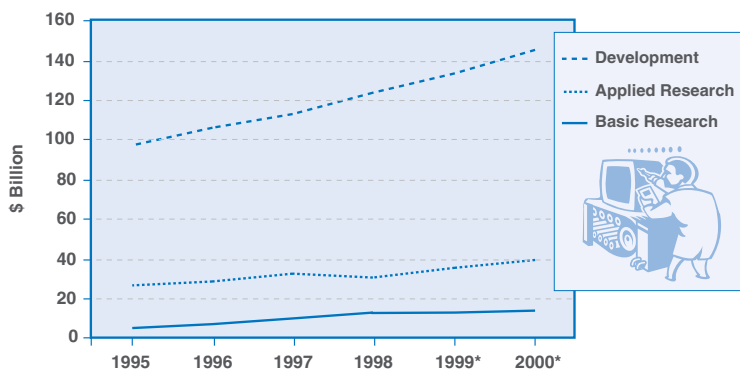
R&D as a Percent of Sales, 1999



Full-Time Equivalent R&D Scientists and Engineers by Industry, 1992-1999



Industrial R&D Spending by Category, 1995-2000



* Preliminary data

Sources: R&D in 1999; NSF; Annual Survey of Manufacturers 1999, Dept. of Commerce



GUEST
EDITORIAL

States' options for NICE³ participation broadened

by Lisa Barnett
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OIT's National Industrial Competitiveness through Energy, Environment, and Economics (NICE³) program provides funding to state-industry partnerships for projects that demonstrate advances in energy efficiency and clean production. State-industry partnerships can get one-time Federal grants of up to \$525,000 with the industrial partner receiving up to \$500,000.

In the past, industrial applicants were required to submit NICE³ grant proposals through a state energy, pollution prevention, or business development office. While State Energy Offices assisted local applicants with their proposals, resource constraints prevented many states from helping firms produce high-quality proposals.

So last year after discussions with states on ways to improve NICE³, we decided to allow states more ways to participate in the NICE³ program. Some states have continued to work closely with local firms on their grant proposals while others have allowed local firms to submit directly to DOE with only the state endorsement. Lynn Stoddard, the NICE³ representative from Connecticut, said "We favor flexibility in allowing different approaches to the states' involvement with NICE³. However, we feel our involvement in the process has significant value for the industrial proposer and DOE."

Recent NICE³ proposals have been split about '50-50' between direct submissions by industry (with state endorsement) and state office submissions. Our new program direction allows states greater flexibility to meet the needs of local firms while simultaneously maintaining state involvement in NICE³ proposals and awards.

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technology development spectrum. Individual or small business inventors can receive assistance through OIT's **Inventions and Innovation** program to develop their concept and business plans. To move promising technologies into demonstration mode, OIT's **NICE**³ program assists entities wishing to demonstrate emerging technologies in partnerships with state offices. These demonstrations help prove to potential technology customers that the technologies can work well in the real world, measurably reducing energy use and costs.

OIT R&D solicitations target key energy-saving opportunities in industry not only by technology area, but also by class of technology developer. While some solicitations are open to industry-led teams, others are geared toward teams of researchers led by a national lab while others are directed

toward university-led R&D partnerships. This diversification of project leadership helps ensure the strengths of each type of research organization can contribute to broad energy goals.

Finally, OIT's RD&D portfolio is further enriched by the broad cross-industry applicability of the many innovative concepts and technologies within its embrace. As suggested by the projects profiled in this issue, a technology innovation designed to increase efficiency in one industry can be adapted for use in strikingly different industrial environments. Indeed, the high cost of RD&D and the rapid pace of technology advancement have prompted industry to be alert to new ideas and borrow freely from other industries. The IOF strategy provides a fertile forum for such cross-industry fertilization of innovative ideas and even cross-industry partnerships.